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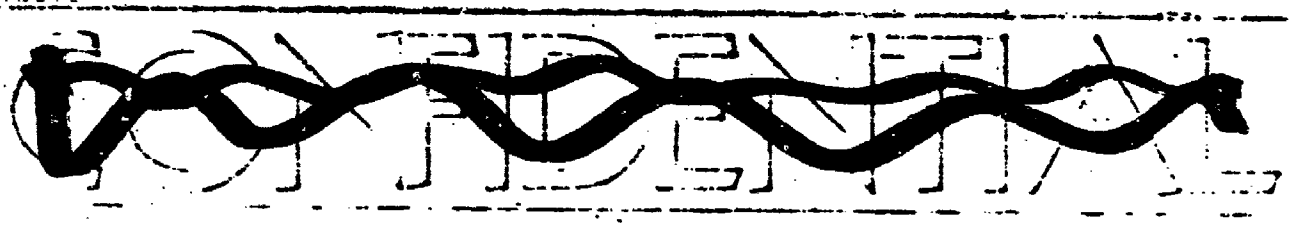
AUTHORITY
ARRADCOM, via ltr, 3 Feb 1980; DA Form 1575, 25 May 1995

AD- 1709 3



[redacted]
SECURITY INFORMATION

EXAMINATION OF UNFIRED 85 MM APHE-T, COMPLETE ROUND OF SOVIET AMMUNITION, MCD USR-365 FTAA-2284

Project No T33-0035 Report No 1

Picatinny Arsenal Serial No 1911 April 1953

Prepared by: M. S. Vliet

[redacted]

[redacted]
SECURITY INFORMATION

Agency Performing Work:	Picatinny Arsenal
Agency Authorizing Work	Chief of Ordnance -CRDTA
Project No T33-003>	Report No 1
Priority, DOA	2A

Project Title: Examination of Captured 85 mm AP[redacted]-T, Complete Round of Soviet Ammunition, Mod UBR-365 ([redacted]-2234)

OBJECT

To conduct a technical examination, including preparation of photographs, dimensioned sketches, a complete round drawing, chemical analysis of explosives and metallurgical examination of the projectile and cartridge case.

SUMMARY

One loaded and fuzed complete round of Soviet 85 mm AP[redacted]-T, Ammunition was subjected to technical examination. The complete round consists of a base-fuzed, uncapped, armor-piercing projectile and tracer, assembled in a primed brass cartridge case. The cartridge case contains a coil of soft lead wire, two closing cups, cylindrical distance rod and a propellent powder charge packed loosely in a bag. A black powder igniter charge is contained in a separate plastic pad in the cartridge case at the base of the propellent charge bag.

[redacted]
SECURITY INFORMATION

INTRODUCTION:

In accordance with request from the Chief of Ordnance, Ref A (Incl 8), one unfired complete round of Soviet 85 mm AP-T, Mod UBR-365, Ammunition was subjected to technical examination. Metallurgical examination, with dimensional drawing of a similar cartridge case was made at ?A, Ref C. Metallurgical examination, with dimensional drawing of the projectile was made at Watertown Arsenal, Ref "B", and general and chemical examination of other components were made at Picatinny Arsenal.

DESCRIPTION:

1. Complete Round

a. General

The complete round is shown, as received, and after disassembly into its principal components, on Photograph M-41457 (Incl 1). A complete round assembly, in section, is shown on Drawing P-85058 (Incl 2). The cartridge case is attached to the projectile by a 360° crimp into a single groove to the rear of the projectile rotating band.

The propellant powder consists of cylindrical, multi-perforated grains contained in a cloth bag. The bag is closed with a cotton cord at the mouth. The igniter charge of black powder is contained in a separate plastic pad. After insertion of the igniter pad and propellant bag, a coil of soft lead wire is placed on the forward end of the charge. This lead wire is used as a decoppering agent to prevent fouling of the gun barrel with copper from the rotating band. Forward of the charge is a waxed paper closing cup, cylindrical spacer and a second closing cup. The second closing cup has a central hole to permit the exposed end of the tracer assembly to enter the paper cylinder. This spacer assembly serves to hold the propelling charge against the primer boss. The various parts referred to are shown on Photograph M-41457 (Incl 1).

b. Data

Weight of complete round	34.36 lb
Length of complete round	32.48 in
Diameter of lead wire (approximately)	.04 in
Weight of lead wire (approximately)	.06 lb

c. Marking

Printing in black on the bag is as follows:

54 - Ж-383
85мм ЗБМ ПТП
0Бр. 33г
14/7с3. 25/15т 3/3
31-43-Т.
ЗАРЯД БОЕВОЙ
2542 г

2. Projectile

a. General

The projectile consists of a steel body with two copper rotating bands. The base is of boattail design. A sectioned view of the projectile is shown on Drawing P-85058 (Incl 2). Immediately to the rear of the bourrelet is a deep circumferential groove which is packed with a heavy grease. To the rear of the rotating bands, on the cylindrical surface, is a shallow groove for crimping the cartridge case to the projectile. The projectile does not incorporate an armor-piercing cap.

At the base of the projectile is a bursting charge cavity threaded for a base fuze with tracer assembly. A lead caulking ring seals the forward flange of the fuze against a shoulder in the cavity. One cushion of paper is used to fill the void between the fuze booster and the bottom of the booster cavity. A total of four paper washers and one aluminum foil washer fills the void between the fuze body and the bursting charge.

The sharp "V" groove in the body just below the bourrelet is believed to be present for controlled location of fracture of shot upon impact. This may serve a useful purpose at high obliquity striking angles.

b. Data

Weight of projectile as fired	20.13 lb
Weight of projectile, empty	19.71 lb
Length of projectile	10.47 in
Diameter of Bourrelet	3.340 in
Degree of boattail taper	9°
Width of rotating band (flat)	.437 in
Weight of bursting charge ([illegible] / Aluminum)	.15 lb

c. Marking

The projectile is marked, in black, as follows:

	Obverse	Reverse
On the ogive		8
On the body	85	
	3.77	
	14-44	
On boattail	1	
	6d	

The following stamping appears on the projectile rotating band:

2-9X

(4Y)

d. Metallurgical and Chemical Analysis

Results of the metallurgical examination of the projectile including a dimensioned drawing are contained in Watertown Arsenal Metallurgical Report No WAL 762/844, Ref 8.

Chemical analysis of the bursting charge is contained in Picatinny Chemical Laboratory Report No 53-ML-903 (Incl 7).

3. Fuze

a. General

The fuze assembly is shown in section on Drawing P-83975 (Incl 3) and disassembled into its main components on Photograph M-38645 (Incl 4). A comparatively small tubular booster assembly, on the forward end of the fuze, is imbedded in the bursting charge. The fuze consists of a steel fuze body, lead cushioning ring, primer assembly, steel arming sleeve, steel firing pin, delay charge assembly, copper delay charge washer, fiber detonator cushion, detonator assembly and a booster assembly.

b. Functioning

The fuze is believed to function as follows: When the round is

fired, set-back force causes the split arming sleeve to move rearward, being forced open by the larger diameter of the fuze primer assembly, and to come to rest against the lead cushion, thereby arming the fuze. Upon impact with the target the primer assembly moves forward impinging the primer against the firing pin. The flame from the primer passes through the flash hole in the firing pin, igniting the delay charge. The flash from the delay charge passes through to the detonator initiating the detonator charge which, in turn, functions the booster charge.

e. Detonator-Booster Assembly

The detonator-booster assembly consists of a steel booster body, a booster charge consolidated in the base of the body and a detonator assembly. One paper washer and two thin paper discs are interposed between the delay charge assembly and the detonator assembly. A delay charge assembly is screwed into the open end of the detonator-booster assembly which, in turn, holds the firing pin in position when assembled in the fuze body.

d. Data

Weight of fuze with tracer	.27 lb
Length of fuze with tracer	2.58 in
Thread Data, (Metric) Major - 24. mm	Pitch - 1.5 mm

e. Tracer

The tracer assembly consists of a drawn steel body, a steel tracer cup containing the pressed tracer charges and a celluloid closing disc, .009 inch thick. The tracer and tracer igniter charges are consolidated in the charge container in that order, and the upper surface of each finished with a three-step pattern. The celluloid closing disc is dropped in the tracer body and the charge container is pressed into place with the open end towards the disc. The threaded body is then screwed onto the base of the fuze.

f. Booster

The booster assembly consists of a drawn steel body containing the booster charge, and holding the detonator assembly and delay assembly. The booster charge is consolidated in the forward or cup portion of the body. The firing pin is held in place by the booster assembly and a shoulder in the fuze body.

g. Data

Length of booster body	1.04 in
Thread Data (Metric) Major - 18. mm	Pitch - 1.5 mm

b. Chemical Examination

Analysis of the tracer, primer, delay detonator, and booster charges are contained in Pi Chem Lab Rpt No 53-21-908 (Incl 7).

4. Cartridge Case

a. General

The cartridge case, which is of brass, is of conventional design. In the base is a threaded hole for assembly of a short type percussion primer. When assembled to the projectile, the cartridge case is attached by a single 360° crimp into a groove in the projectile body. Results of the metallurgical examination, and dimensioned drawing of a similar cartridge case, are contained in Frankford Arsenal Ordnance Laboratory Report No 13-483 (Ref C).

b. Data

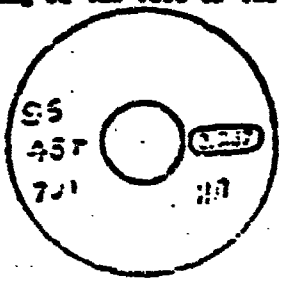
Weight of Cartridge Case, Empty	8.22 lb
Diameter at mouth of Case	3.366 in.
Length of Case	24.60 in
Max Diameter of Extractor Flange	4.30 in
Diameter of flat above Flange	4.00 in
Thickness of Extractor Flange	.16 in

c. Marking

Stenciled in black, the following markings appear on the side of the cartridge case:

USP-355
83-3[illegible]
14/C3 3/45T 8/2
180-45-[illegible]

Stamped marking on the base of the cartridge case is as follows:



5. Propellant Charge

a. General

The propellant charge is contained in a cloth bag. It consists of multiperforated cylindrical grains. Analyses of the propellant and black powder igniter charges are contained in the Pa Lab Rpt No 51-EL-903 (Incl 7).

b. Data

Weight of propellant charge with bag	3.69 lb
Weight of igniter charge	20.50 grams
Weight of lead wire	.06 lb
Diameter of lead wire	.04 in

6. Primer

a. General

The primer is the standard Soviet KB-4 short percussion type provided with threads for assembly into the base of the cartridge case. An assembly view and details are shown on Drawing P-83410 (Incl 9). It consists of a steel primer body, brass primer cup containing the primer charge and held in a brass primer cup holder; obturator in brass retaining screw; loose black powder charge, black powder pellet, paper inner disc and a copper outer disc crimped into position to close the forward end of the primer assembly. A paper label in the form of a disc, is shellacked on the outside of the coated copper closing disc.

b. Data

Weight of primer	.16 lb
Length of primer	.94 in
Diameter of head	1.173 in
Thread Data (Metric) Major 28.— mm Pitch - 1.8 mm	

c. Functioning

The primer is believed to function as follows: deformation of the body caused by the impact of the firing pin, presses the composition in the cup against the retaining screw, the lower end of which forms the anvil, igniting the composition. The flame passes around the obturator and through the hole in the retaining screw, igniting the loose powder. This ignites the black powder pellet which in turn causes the initiation of the propelling charge assembly.

7. Packing

The Soviet 85 mm AP(T)-T, Complete Round was received packed in an improvised wooden box. No information is available as to the standard method of packing this round for shipment to the field.

REFERENCES:

A. Letter, CO 386.3/64, CRDDB 386.3/2
B. Watertown Arsenal Ordnance Laboratory Report WAL 762/644
C. Frankford Arsenal Metallurgical Report No MR-483

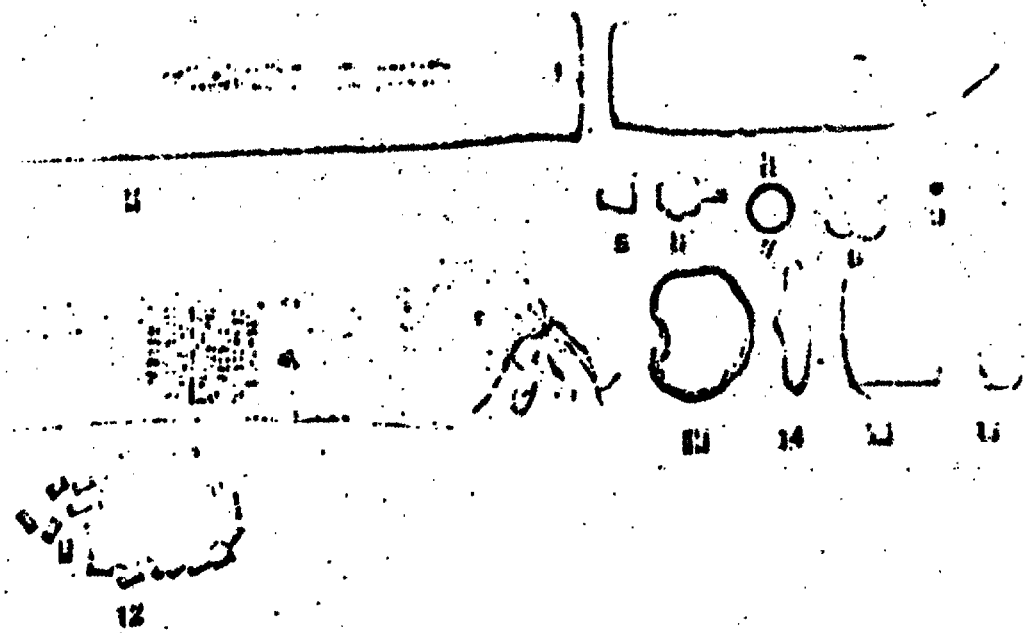
ENCLOSURES:

1. Photograph M-41457
2. Photoprt P-83058
3. Photoprt P-83975
4. Photograph M-38645
5. Photograph M-41457/1
6. Photograph M-41457/2
7. PA Gen Lab Rpt 53-E1-908
8. Copy letter Ref A
9. Photoprt P-83410

EXAMINATION OF UNFIRED 85 MM APHE-T, COMPLETE ROUND
OF SOVIET AMMUNITION, MDD USR-365 FCDA-2284

Report by: M. S. Vliet
M. S. Vliet
Engr Aide

Approved: C. V. Clark
for C. V. CLARK
Col, Ord Corps
Chief, Tech Div



M-41457 February 1953 Picatinny Arsenal PAM-2284 Ordnance Corps

85mm APHE-T Round (Soviet) Mod. UBR-365

1. Complete Round
2. Percussion Primer
3. Cartridge Case
4. Projectile
5. Tracer
6. Fuze
7. Washer
8. Aluminum & Paper Washers
9. Felt Spacer
10. Paper Closure
11. Igniter Powder
12. Propellent Powder
13. Lead Wire
14. Closing Cup (Lower)
15. Spacer
16. Closing Cup (Upper)

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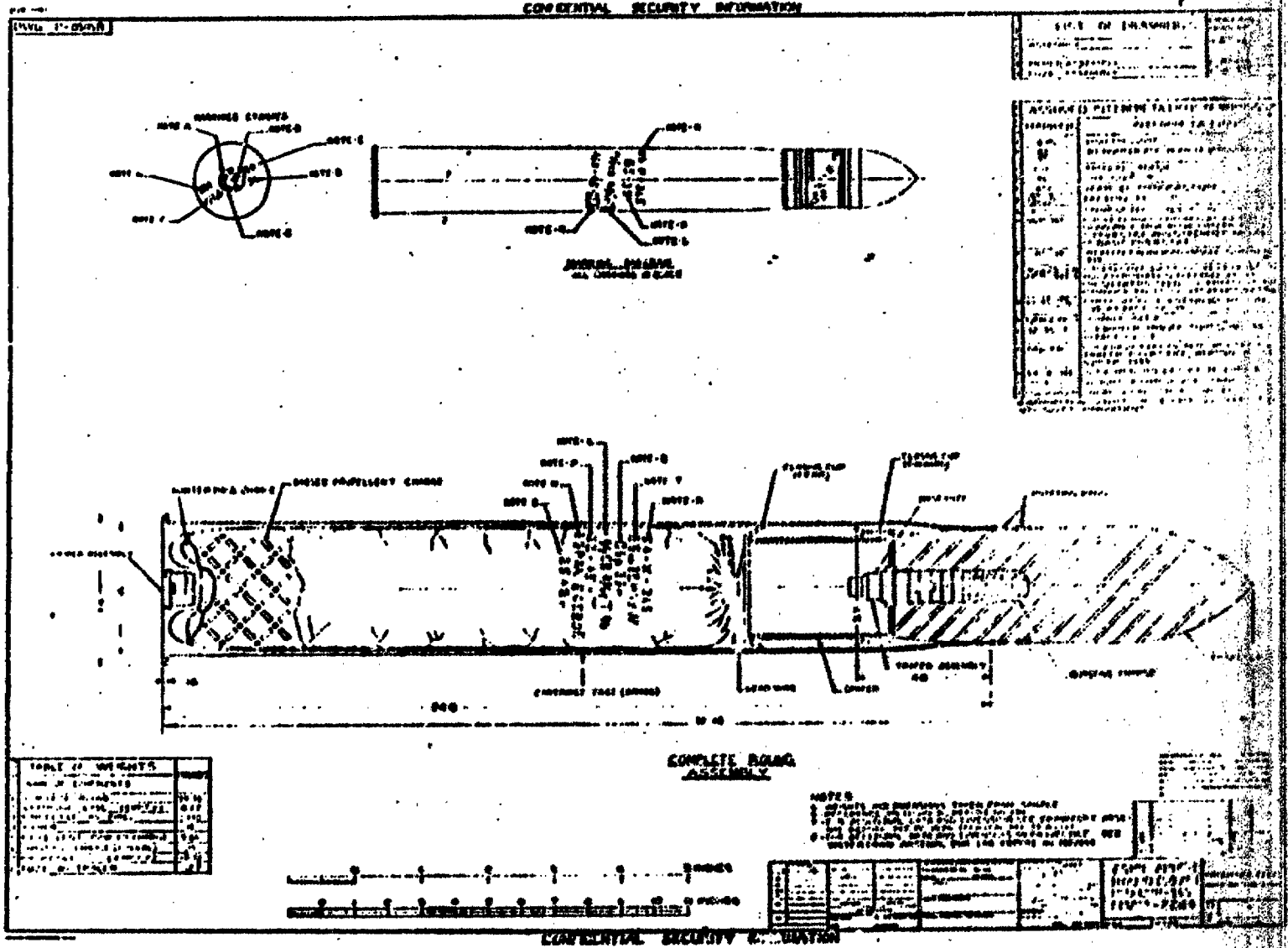

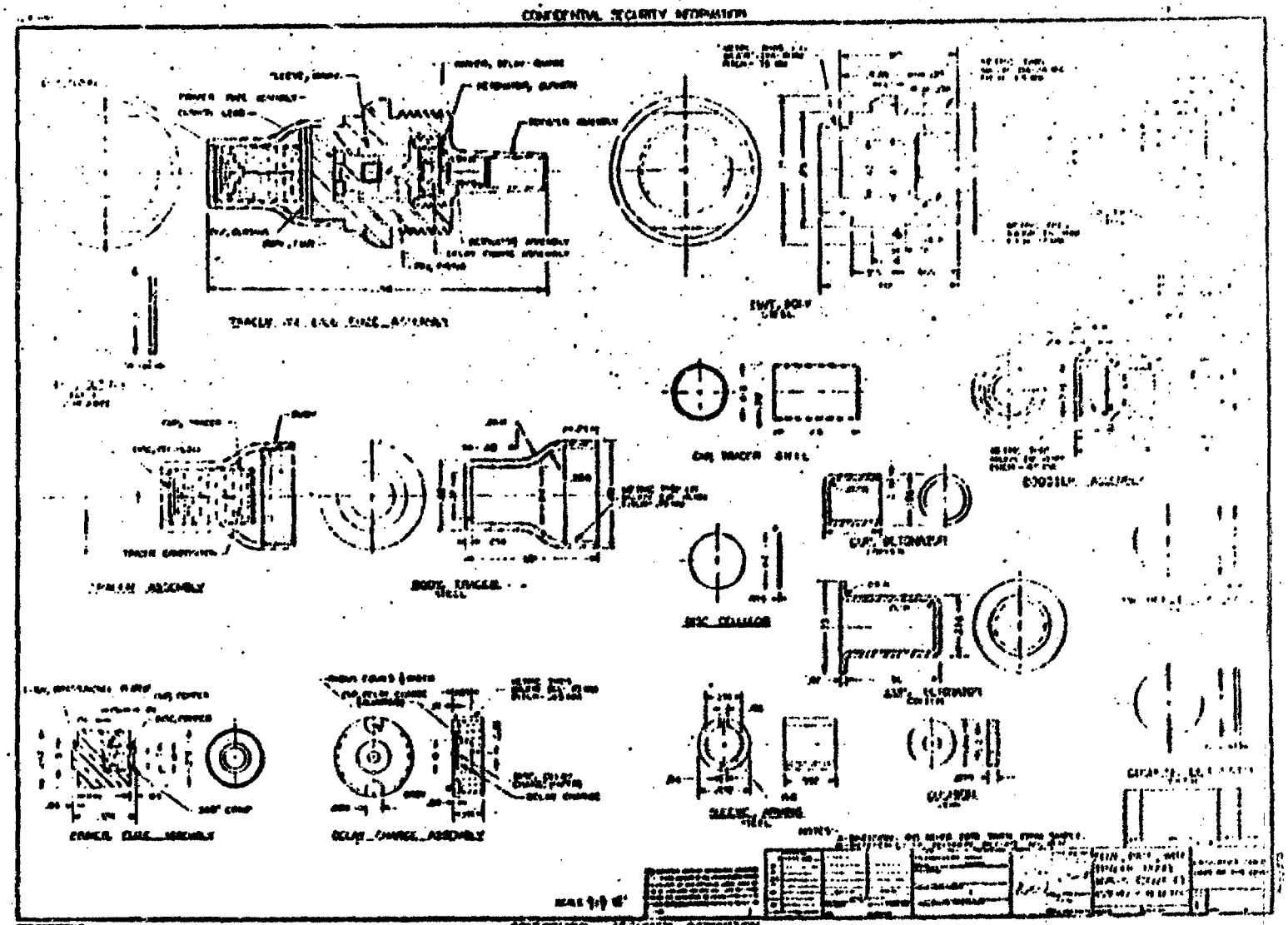

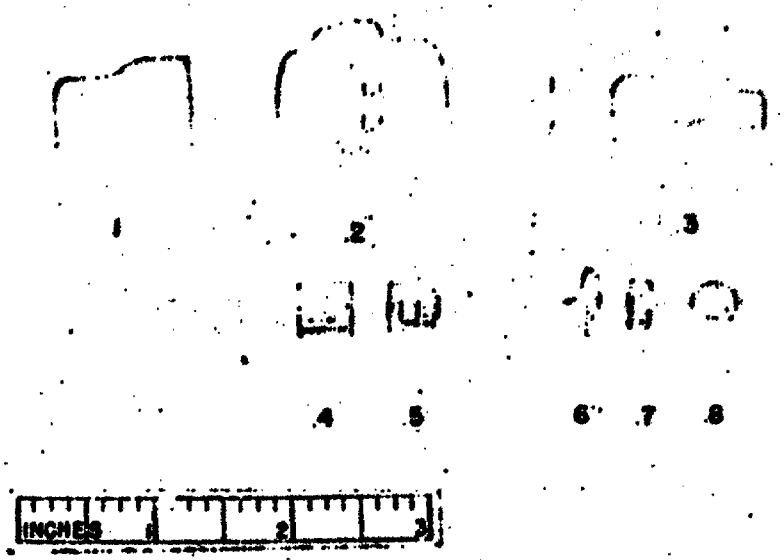

R-30645 May 1951 PICATINNY ARSENAL ORDNANCE CORPS

Fuse, Base, with Tracer (Soviet),

1. Tracer Assembly
2. Fuze Body
3. Detonator Booster Ass'y.
4. Arming Sleeve
5. Primer Assembly
6. Firing Pin
7. Delay Charge Ass'y.
8. Detonator Washer
9. Closing Discs

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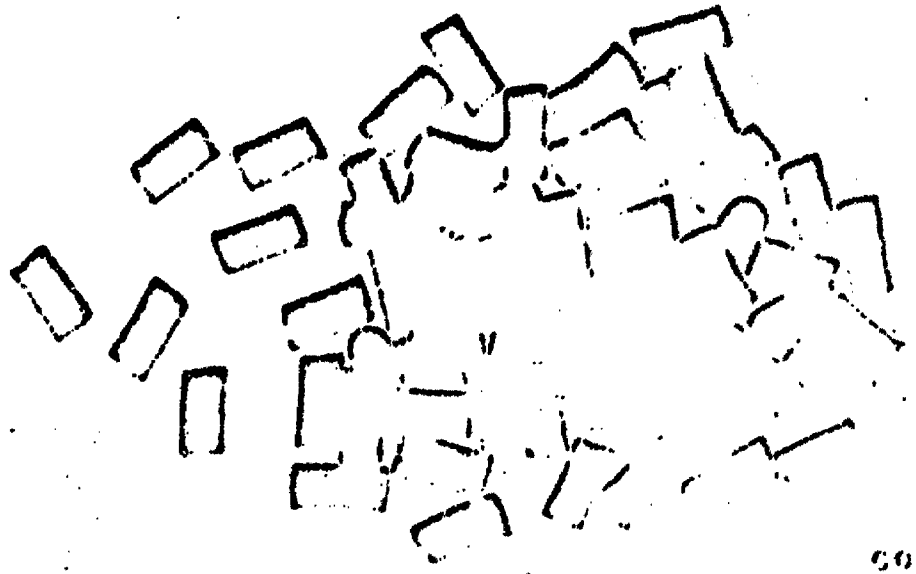
Security Information



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Security Information

M-41457/1 February 1953 PICATINNY ARSENAL PAM-228 ORDNANCE CORPS

Propellent Powder from 85mm APHE-T Round (Soviet)

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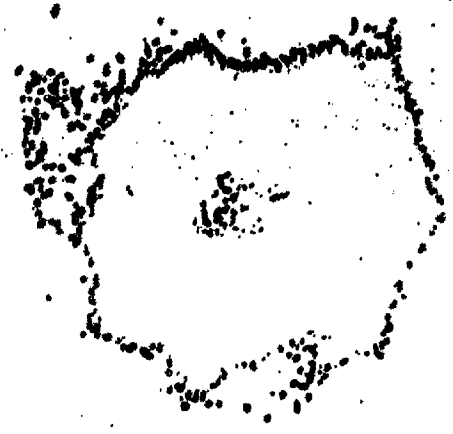

M-41457/2 February 1953 PICATINNY ARSENAL FHAM-2284 ORDNANCE CORPS

Igniter Powder from 85mm APHE-T Round (Soviet)

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SECURITY INFORMATION

PICATINNY ARSENAL, DOVER, N. J.

REPORT FROM THE GENERAL LABORATORY

R POST NO. 53-61-900

DATE 13 April 1953

SAMPLE NO.

DATE RECEIVED

KIND OF SAMPLE: Foreign Ammunition, Soviet, 85 mm C/R APHE-T Mod.-HRR-365

RECEIVED FROM: Design Dftr and Foreign Ammo Unit of Ammo Dev Br A FHAM 2281

REFERENCE OR K.O.: 329-606-901

REPRESENTING: Explosive Charges from the Round

Object:
To make the following determinations on the components listed below:

Results:

Cartridge Case Primer - "See Remarks"		
Primer Charge		
Weight of Charge, gm		0.020
Chemical Composition:		
Mercury Fulminate, %		33.0
Potassium Chlorate, %		27.5
Antimony Sulfide, %		34.5
Carborundum, %		5.0
First Flash Charge: (Loose Material)		
Weight of Charge, gm		0.57
Chemical Composition:		
Potassium Nitrate, %		73.6
Sulfur, %		9.5
Charcoal, % (by diff)		16.9
Ash (mostly iron oxide), %	1.6	
Second Flash Charge (Pellet)		
Weight of Charge, gm		5.5
Chemical Composition:		
Potassium Nitrate, %		73.6
Sulfur, %		9.1
Charcoal, % (by diff)		17.3
Ash (mostly copper and iron oxide)	1.1	

WORK BY: SUBMITTED: APPROVED:

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SECURITY INFORMATION

Igniter Propellant:
Weight of Charge, gm 20.6
Chemical Composition:
Nitrocellulose (by diff), % 97.2
Nitrogen, % 13.01
Diphenylamine and Nitro-derivatives of diphenylamine, % 1.4
Graphite, % 1.4

Propellant
Weight of Charge, lb 5.60
Chemical Composition:
Nitrocellulose, (by diff), % 95.4
Nitrogen, % 12.72
Diphenylamine and nitro-derivatives of diphenylamine, % 1.3
Total Volatiles, % 3.3

Grain Measurements, inch

Form	Multiperforated
L = 0.6157	Avg Var % 3.16
D = 0.2937	Avg Var % 1.80
d = 0.0225	
W_o = 0.0620	Difference between W_i and W_s in % of W_s = 19.26
W_i = 0.0511	
W_s = 0.0566	Ratio - L:D = 2.10
W_c = 0.0566	Did =13.05

Fuse Assembly: "See Remarks"
Primer:
Weight of Charge, gm 0.023
Chemical Composition:
Mercury Fulminate, % 21.0
Potassium Chlorate, % 42.0
Antimony Sulfide, % 37.0
Delay Charge
Weight of Charge, gm 0.19
Chemical Composition:
Potassium Nitrate, % 74.5

Sulfur, %	10.2
Carbon, % (Diff)	15.3
Detonator:	
Top Charge:	
Weight of Charge, gm	0.038
Chemical Composition	Lead Styphnate
Intermediate Charge:	
Weight of Charge, gm	0.13
Chemical Composition	Lead Azide
Bottom Charge:	
Weight of Charge, gm	0.40
Chemical Composition	Tetryl
Booster:	
Weight of Charge, gm	0.40
Chemical Composition	Tetryl
Tracer Assembly	
Igniter	
Weight of Charge, gm	0.6
Chemical Composition:	
Barium Peroxide, % (Diff)	75.4
Magnesium, %	20.4
Binder, %	4.2
Tracer	
Weight of Charge, gm	
Chemical Composition:	
Magnesium, %	58.0
Strontium Nitrate, %	33.8
Binder, %	8.2
Bursting Charge	
Weight of Charge, lb	0.15
Chemical Composition:	
NDI, %	72.2
Aluminum, %	21.7
Wax (Paraffin), %	6.1

SECURITY INFORMATION

PICATINNY ARSENAL, DOVER, N. J.

REPORT FROM THE GENERAL LABORATORY

51-III-308

DATE

13 April 1953

REMARKS:

The chemical analysis of the fuze charges and tracer compositions was taken from General Laboratory Report No. 51-7-951 and that of the primer charges was taken from General Laboratory Report No. 137062 since these components were considered to be the same as the components of the subject round by the Artillery Ammunition Section.

WORK BY:
A. Callanan
I. Kolier

SUBMITTED: E. F. Roose
E. F. Roose
Chief, Exp Anal Unit

APPROVED: A. J. Clear
A. J. Clear
Chief, Gen Lab Sec

4

[redacted]

SECURITY INFORMATION

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OFFICE OF THE CHIEF OF ORDNANCE
WASHINGTON, D. C.

[illegible]

[illegible]/74952

3 NOV 1950

SUBJECT: Arrangements for the Examination of Soviet and North Korean Ammunition

TO: Commanding Officer
Picatinny Arsenal
Dover, New Jersey

1. This office is arranging to have Aberdeen Proving Ground ship to your Arsenal, one round of each type of Soviet or North Korean ammunition, which is received from the Theater of Operations. Each such shipment will refer to Project No. TW1-[illegible].

2. It is desired to have your Arsenal make a complete examination and analysis of the various components and submit a technical report on the results. This examination should include the usual factors, such as the general design, weight, and chemical analysis of the propelling charge and primer charges and general design features of fuzes, projectiles, cartridge cases, etc. Any [illegible] removed from rounds should be sent (after removal of all explosives) to Watertown Arsenal, for metallurgical examination.

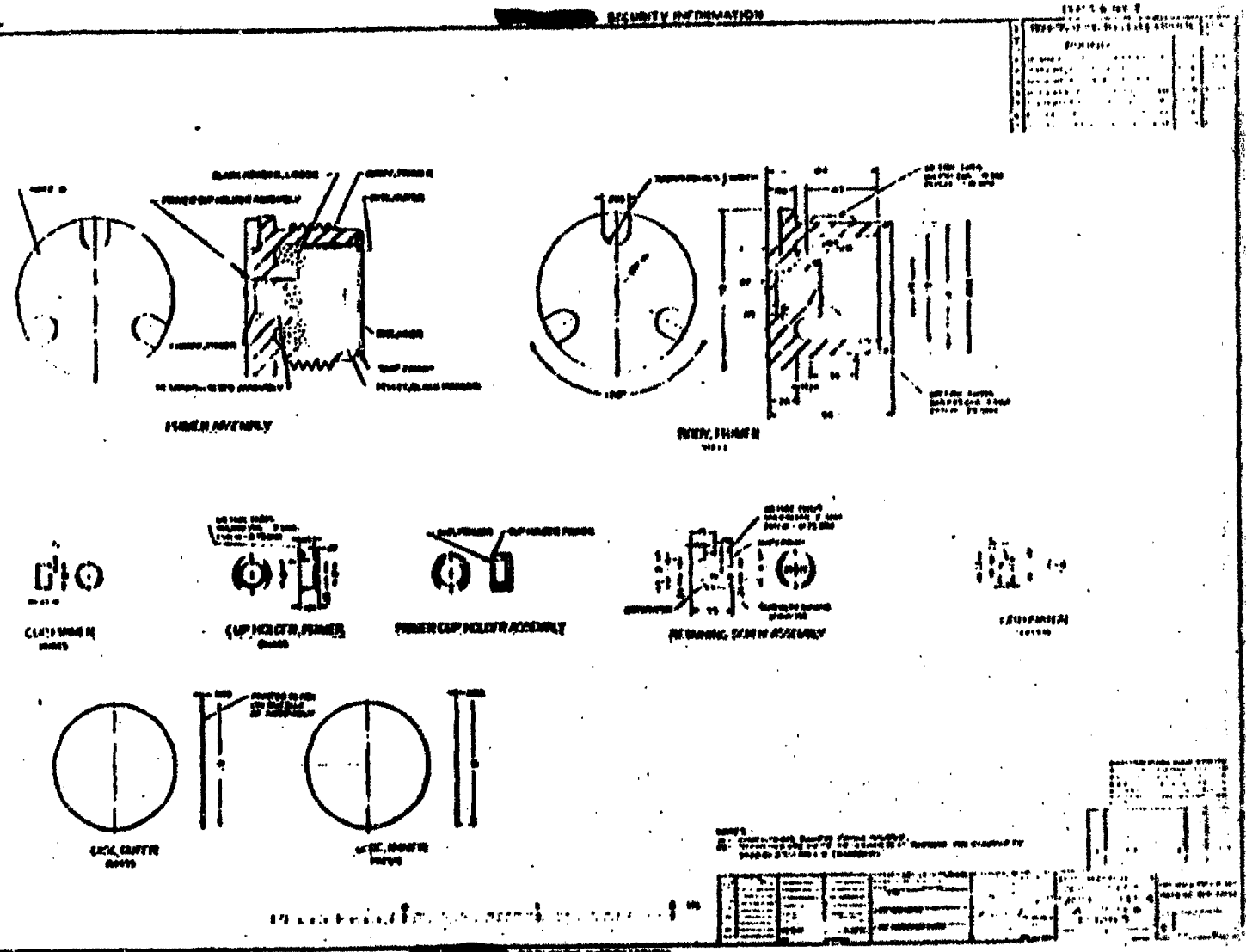
3. The funds required for this work should be taken from those available under Project No. TW1-[illegible]; the priority of this program is 2A. The security classification of the reports should be [illegible].

BY COMMAND OF MAJOR GENERAL FORD:

[illegible], Jr.
Col, Ord Corps
Assistant

CC
Watertown Arsenal

[redacted]



SUPPLEMENTARY

INFORMATION

ERRATA

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For use of this form, see AR 380-5; the proponent agency is OACSI.

DATE: 25 May 05

FILE:

READ INSTRUCTIONS ON REVERSE SIDE BEFORE COMPLETING THIS FORM

TO: (Include ZIP Code)
Director
Defense Technical Information Center
ATTN: DTIC-OC
Cameron Station
Alexandria, VA 22304-6145

FROM: (Include ZIP Code)
US Army - ARDEC
AMSTA-AR-IMC, Bldg. 30
Picatinny Arsenal, NJ 07806-5000

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AD495598	PATR-1807 Approved for public release	U/Ltd	U/Unltd
AD017093	PATR-1911 Approved for public release	U/Ltd	U/Unltd
AD913525	PATR-4554 Approved for public release.	U/Ltd	U/Unltd

ERRATA
AD-017093

PRINTED OR TYPED NAME AND TITLE OF OFFICER
Suseela Chandrasekar
Chief, Information Research Center

SIGNATURE
Suseela Chandrasekar

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